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Editor's Note

Ever since Shannon (1948) and Hamming (1950), one of the dominant concerns of information theorists has been the problem of determining bounds on the quality of the best long binary codes with fixed rate. Those with a statistical orientation have generally sought tighter bounds on $E(R)$, the reliability function for various channels, while those with a more combinatorial orientation have generally sought bounds on the relationship between the minimum distance of a good code and the number of its codewords. As pointed out by Shannon, Gallager, and Berlekamp (1967), these two approaches to the same problem are closely related. Any asymptotic improvement in the bounds on the minimum distance of binary codes will yield improvement in the reliability function for the binary symmetric channel at low to medium rates, and vice versa.

The only known bound on the asymptotic quality of binary codes is due to Gilbert (1952). There have been many upper bounds, including those of Hamming, Plotkin, and Elias. The Elias bound remained the champion (uniformly) for more than a decade. The following papers, by Sidelnikov and Levenshtein, uniformly supersede the Elias bound. These two papers have reopened this classical problem. McEliece, Rodemich, Rumsey, and Welch recently announced a new bound which beats Sidelnikov–Levenshtein at low rates, and further improvements may be imminent.

We are publishing a translation of these papers so that they may be more readily accessible to English-speaking workers in the field.